

belonging to the group of *Insectivora*, I have had an opportunity of examining a skeleton, now in the possession of Major Christie, and which Mr. Stuart himself had prepared at the time the animal was killed. This skeleton, by the presence of the marsupial bones, distinctly shows that the quadruped in question belongs to the group *Marsupialia*. It also demonstrates that there was an important error in the dental formula as given me in the MS. of Mr. Stuart,—the very error, indeed, which led me to think that the animal might eventually be found to belong to the *Insectivora*. The true dental formula, as taken by me from the skeleton, is as follows:—

Incisors $\frac{4-4}{3-3}$ + canines $\frac{1-1}{1-1}$ + pseudomolars $\frac{3-3}{3-3}$ + molars $\frac{4-4}{4-4} = 46$.

Now this formula is that of *Phascogale*, from which genus our animal however differs in the three lateral incisors of the upper jaw being of equal size, and also in the pseudomolars being all of equal size. I am however in hopes of soon possessing a specimen from Spring Cove, when I shall be able to determine how far this animal differs from the genus *Phascogale*, or whether it may not be safely assigned to it.

I remain, &c.

Elizabeth Bay, near Sidney, Aug. 9th, 1841.

W. S. MACLEAY.

XLIII.—*Notice of a hitherto unobserved Character distinctive of the Sexes in certain Cetoniidæ.* By J. O. WESTWOOD, Esq., F.L.S., &c.

IN a short notice published in these 'Annals' for October last, I communicated the curious discovery, that whilst the females in certain groups of *Lucanidæ* possess a short horny tooth at the extremity of the basal or internal lobe of the maxillæ, their males are destitute of this character. I have now to announce the existence of precisely the same sexual distinction in certain groups of *Cetoniidæ*. Until very recently the maxillæ of the species in this family have been described as possessing entirely membranous lobes, with the exception of *Cremastocheilus*, in which this organ is horny, and armed in both its lobes with strong curved corneous teeth. More recently Gory, Perchéron, and MacLeay have detected corneous teeth in the maxillæ of other *Cetoniidæ*, which character has accordingly been employed, especially by the last-named author, to characterize many of the groups which he has proposed in his quinquarian arrangement of the family, published in Dr. Smith's 'African Zoological Researches.'

None of these authors were however aware that the possession of a corneous tooth in the mando or inner lobe of the maxillæ is in some cases a sexual character; and consequently, as they have omitted to notice from which sex their descriptions have been derived, the characters of all their groups will require a careful revision before they can be considered as satisfactorily established.

Having some years ago, whilst making the dissections of the typical *Goliathi* for the 'Coleopterist's Manual,' ascertained the remarkable dentation in the maxillæ of the types of that group, which differ so materially from all the other *Cetoniidæ* in this respect, I have carefully examined these organs in the other allied *Cetoniidæ*, especially as I had determined to figure some of the more curious forms in my 'Arcana Entomologica.' For this purpose I made, in the spring of the present year (1841), drawings of several species and of their anatomical details, some of which were published in the first number of the work just mentioned, which appeared on the 1st of May. We here find the maxillæ of *Mycteristes rhinophyllus*, male, armed on the upper lobe with several teeth; and the same is the case in both sexes of *M. Cumingii*; the maxilla of the female of that insect being like that of the male, I did not figure it. In *Dicronocephalus Hardwickii* ♂ the lower lobe of the maxillæ is quite simple, and the upper lobe corneous, straight, and acute at the tip. So far, it is true, no sexual variations were observed; but on dissecting the male *Goliathus (Eudicellus) Morgani*, of which Mr. Hope possesses both sexes (in April 1841), I observed that the maxilla was destitute of any tooth on the lower lobe; whereas I found the females of *G. (E.) frontalis* and *aurata*, in Mr. Melly's cabinet, armed with a strong tooth on this part; and on returning to town from Liverpool (which I had visited in company with Dr. Burmeister, in order to study Mr. Melly's collection), I found the same character in the female of *G. (E.) Morgani* in Mr. Hope's collection*. I likewise detected the same character in the mando of the female of *G. polyphemus* in Mr. Turner's collection, and also in the female of *G. torquatus* in Mr. Hope's; whereas in the male of the latter species, as Prof. Burmeister informs me, the inner lobe of the mando is unarmed.

Since Dr. Burmeister's departure from England, I have been much engaged in dissecting the majority of the genera and a great number of the species of the *Cetoniidæ*, with the view of investigating the natural classification of that family,

* I have recently received a letter from Prof. Burmeister, dated Nov. 14, 1841, in which he mentions his having discovered this sexual distinction in *Gol. (Eudicellus) Daphnis*, *Smithii*, and the species allied thereto.

and have discovered analogous differences in several other species. In *Stephanorrhina* (Burm.) *guttata*, Oliv., the male has the mando unarmed, whilst it is furnished with a short acute horny tooth in the female.

In *Jumnos Roylii* (*Cetonia* R., Hope, in Prof. Royle's work on the Himalaya), the male* has the apex of the inner lobe of the maxilla scarcely produced beyond a straight line; whereas in the female it is armed with a strong curved tooth. In the *Rhomborrhinae* (*Cetonia opalina*, *Melli*, &c.) the males have the lower lobe almost unarmed, whilst in the females it is strongly hooked. In *Cetonia* (*Coryphe*) *elegans* both lobes of the maxillæ are obtuse in the male, but much more acute in the female; whilst in *C.* (*Trigonophorus*, Hope) *Hardwickii* the apex of the lower lobe is much more acute in the female than in the male, although conical and corneous in the latter.

In *Goliathus* (*Dicronorrhina*, H.) *micans*, on the other hand, the lower lobe is unarmed in both sexes; and the same may be said to be the case in the three fine African species unknown to Gory, Perchéron, and MacLeay, which constitute a small group, to which I have given the name of *Tmesorrhina* (Arc. Ent., pl. 19), except that in the females the mando is slightly produced into a small point. In *Coryphe* *MacLeayi* the mando is produced in both sexes into an angulated point, rather more acute in the female than in the male; but in *Coryphe umbonata* and *Diceros bicornuta*, I have not found any distinction in the maxillæ of the opposite sexes. The same is also the case in the interesting African *Schizorrhina cyanea*, Oliv., only here the maxillæ are of different form.

To those who have investigated the structure of the trophi of insects, a difference of the kind, mentioned in this and my former notice as occurring in some *Lucanidæ*, will be considered interesting, because, of all the organs, none exhibit so constant a uniformity of structure as the maxillæ. "Maxillam constantissimam invenimus, vix in congeneribus variat"—and "Maxillæ et labium tunc constantissima, semper simillima," observes Fabricius; and Mr. MacLeay places it in the least variable position in his table of the variation of the organs of insects ('*Horæ Ent.*,' p. 5). The only notice I have found of a sexual difference in this part is in the genus *Nemognatha*, belonging to the Heteromorous Coleoptera, where the upper lobe is exceedingly elongated, which character has been surmised to be sexual (K. and S., *Introd.*, vol. iii. p. 317).

The discovery of this sexual distinction will render neces-

* The male of this insect agrees with *Jumnos Ruckeri* ♂, as figured in the Transactions of the Entomological Society, in the curious toothling of the fore-tibiæ. It is the female which is figured in Dr. Royle's work.

sary a careful investigation of the structure of the maxillæ in both sexes of the types of the different subgenera and genera of *Cetoniidæ*, in order to learn their natural relations. Beyond this, however, there are various other particulars which are requisite to be determined before we can introduce a single species of *Melitophila* into its natural position with respect to the others. It will be serviceable to give these in the words of Burmeister's letter:—"In the first place, it is necessary to determine whether the specimen under description be a male or female; the former sex may be known by the channelled ventral surface of the abdomen, the convex perpendicular pygidium, and the anterior tibiæ, which are often narrower and toothless, whilst the female has two or three teeth on the outside. The maxilla must then be examined to determine whether the galea or upper lobe be corneous, arcuated, trigonate, with simple or cleft apex; or membranous, arcuated, or truncated at the apex, and of smaller size. In like manner the lower lobe or mando must be examined to determine whether it be armed with a tooth or unarmed, according to the sex:—the form of the clypeus, the mesosternum, prosternum (whether it possess a spine in front of the coxæ or not); the tarsi (whether longer or shorter than the tibiæ); the tibiæ, determining the number and position of the teeth according to the sex; the emargination of the elytra above the coxæ, whether very deep as in *Schizorrhina*, or very feeble as in *Goliathus*. The form of the under lip is also very important in the *Cremastocheilidæ*." Besides these characters, the form of the mandibles, the outline of the prothorax, and the existence of onychiæ between the ungues of the tarsi; and lastly, the variation in the form of the antennæ, according to the sexes, must be noticed.

Unless such particulars as these are attended to, we may as well content ourselves with the Linnæan or Fabrician state of the science, instead of doing our utmost to give to it a higher and more philosophic tone.

XLIV.—*On the Phosphorescence of Zoophytes.* By ARTHUR HILL HASSALL, Esq. M.R.C.S.L., Corresponding Member of the Dublin Natural History Society.

To the Editors of the Annals of Natural History.

GENTLEMEN,

ON reading the Rev. D. Landsborough's paper on the Phosphorescence of Zoophytes in your last Number, p. 281, I am led to refer to my paper read before the Natural History Society of Dublin, November 6, 1840, and published in your